CLAIMS

What is claimed is:

1. An oligonucleotide probe for hybridization analysis comprising:

a nucleotide sequence forming a braided J structure having both a single and a double stranded segment in which said double stranded segment is formed between two perfectly matched nucleotide sequences, and wherein said single stranded segment is composed of a nucleotide sequence that is complementary to a target polynucleotide sequence to be detected; wherein a region between said single stranded segment and said double stranded segment is linked via nucleotides defining restriction enzyme sites, and wherein said double stranded segment contains an end which defines a nucleotide loop constructed and arranged to facilitate fixation to a solid surface and subsequent processing steps.

2. The probe of claim 1, wherein said oligonucleotide comprises DNA and said target polynucleotide sequence to be detected comprises DNA or a detectable fragment thereof.

3. The probe of claim 1, wherein said oligonucleotide comprises RNA and said target polynucleotide sequence to be detected comprises RNA or a detectable fragment thereof.

4. The probe of claim 1, wherein said oligonucleotide comprises both DNA and RNA and said target polynucleotide sequence to be detected comprises both DNA and RNA and detectable fragments thereof.

5. The probe of claim 1, wherein the double stranded segment is a single stranded nucleotide sequence that has folded onto itself by means of two perfectly matched complementary sequences.

6. The probe of claim 1, wherein said looped end consists of unpaired nucleotides bound to a component of biotin-avidin binding system.

7. An array of oligonucleotide probes immobilized via a biotin-avidin binding system on a solid support for hybridization analysis, comprising:

a solid support suitable for use in nucleic acid hybridization having immobilized thereon a plurality of oligonucleotide probes, each of said probes having a nucleotide sequence that forms a braided J structure having a consistent and thermodynamically stable double stranded segment, wherein the double stranded segment is formed between two complementary nucleotide sequences, and wherein a portion of the probe consists of a single stranded nucleotide sequence located at one end of the double stranded segment which is complementary to a target polynucleotide sequence to be detected, and wherein a region between the single and double stranded segments are linked via nucleotides comprising restriction enzyme sites.

8. The array of claim 7, wherein said plurality of oligonucleotide probes comprise DNA and said target polynucleotide sequence to be detected comprises DNA or a detectable fragment thereof.

9. The array of claim 7, wherein said plurality of oligonucleotide probes comprise RNA and said target

polynucleotide sequence to be detected comprises RNA or a detectable fragment thereof.

10. The array of claim 7, wherein said plurality of oligonucleotide probes comprise both DNA and RNA and said target polynucleotide sequence to be detected comprises DNA and RNA and detectable fragments thereof.

11. The array of claim 7, wherein the plurality of probes contain double stranded regions consisting of single stranded nucleotide sequences that have folded onto themselves each by means of two perfectly matched complementary sequences.

12. The array of claim 7, wherein the plurality of probes contain a loop in the folded region that consist of unpaired nucleotides bound to a component of biotin-avidin binding system.

13. The array of claim 7, wherein said plurality of probes attached to a solid surface are processed according to a protocol which includes hybridization and cleaning of the array;

whereby reduction of background and non-specific binding are achieved and said probe becomes capable of withstanding sonification.

14. The array of claim 13 wherein said process protocol includes sonification of said array.

15. The array of claim 13, wherein said process protocol is automated.

16. The array of claim 7 wherein said solid support has a reflective surface or undersurface.

17. The array of claim 16 wherein said reflective surface or undersurface is a mirrored glass.

18. An array of biotinylated antibodies or probes specific to a particular macromolecule immobilized via a biotin-avidin binding system on a solid support for protein or macromolecule analysis, comprising:

a solid streptavidin coated mirrored glass surface having immobilized thereon a plurality of biotinylated antibodies or probes specific for a particular macromolecule.

19. The array of claim 19, further including a labeled protein;

wherein said labeled protein reacts with said biotinylated antibody or probe.

20. The array of claim 18 wherein said macromolecule is selected from the group consisting of a glycoprotein, a simple carbohydrate, a complex carbohydrate and a lipid.